

- For Applications up to SIL4 (EN5012x) or SIL3 (IEC61508)
- Safe I/O boards
- Certification packages available
- Distributed safe I/O and controller boxes connected via real-time Ethernet
- Support for QNX safe operating system
- Compact 40 HP housing for remote locations
- Full EN 50155 compliance
- Rack-mounted or wall-mounted

### SAFE REMOTE I/O FOR TRAIN CONTROL SYSTEMS

KT8 is a safe, remote I/O box inside the duagon SAFE CONTROL (d-SC) System. The modular system platform d-SC is usable for safety-critical train applications like train control, automatic train operation (ATO) and automatic train protection (ATP) up to SIL 4 (EN5012x) or SIL 3 (IEC61508).

### MODULAR I/O CONFIGURATION

Based on modular 19" technology, KT8 provides eight slots for safe I/O cards, which can be configured as built-to-order (BTO) options. d-SC I/O cards support the common I/O requirements requested in trains. The KT series of systems provides scalable sizes of eight slots, six slots and four slots.

### PART OF THE DUAGON SAFE CONTROL SYSTEM

d-SC is a modular SIL 4 certifiable family of CompactPCI-based standard products usable for every kind of safety-critical railway application - from a single function to the main control system of the train. It can be configured to control anything in the train that requires functional safety - under SIL 4, SIL 3 or SIL 2 requirements. d-SC communicates via standard EtherCAT real-time Ethernet and interfaces to any type of consist fieldbus network like MVB, CANopen, Profinet etc. This makes it easy to integrate into a TCN network as well as into regionally different Train Control Systems like ETCS, CTCS, ATCS or Klub-U. The high level of flexibility of d-SC results in significant cost and time savings during computerization of the train.



### COMPACT AND COST-SAVING REMOTE I/O

Being modular and SIL 4 certifiable, the KT series reduces the certification risk and efforts. This makes both your system costs and project schedule predictable. All KT systems have a dedicated EtherCAT component, the I/O head, for interconnection of the boxes and power supply. This in turn reduces cabling. I/O functions can still be located close to the remote actors and sensors, with fast data transmission within the d-SC system. The compact format with a maximum width of 40 HP and a reduced depth compared to standard 3U systems allows installation even where space is very restricted, simplifying retrofitting of older trains.

### CERTIFICATION AND STANDARDS COMPLIANCE INCLUDED

Safety-related d-SC components come with certification packages and complete support for the safe operating system QNX, including safe protocols, I/O framework etc. All d-SC components that are safety-relevant are developed according to EN 50128 and EN 50129 standards and comply with all environmental requirements of EN 50155 for rolling stock: temperature class TX, shock, vibration, humidity, dust, isolation, PSU hold-up times, EMC regulations etc.

### MOUNTING AND COOLING OPTIONS

The system can be wall or rack-mounted, also on a DIN rail, and is air cooled.



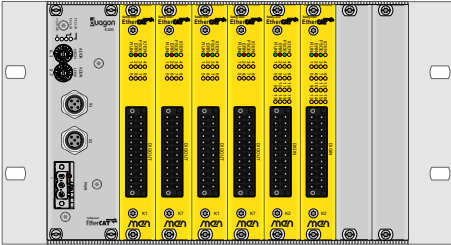
[www.duagon.com/products/kt8/](http://www.duagon.com/products/kt8/)

## DATA SHEET

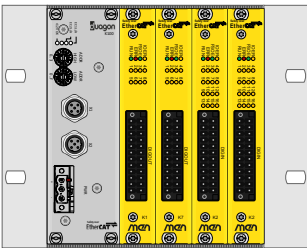


# KT8 | DIAGRAM

## d-SC Remote I/O Boxes KT8 and KT4



- KT8, Configuration Example**
- 2 x 8 digital outputs, SIL 4, through K1/K7 combination: high-side and low-side switching
  - 16 digital inputs, SIL 4, through 2 x K2

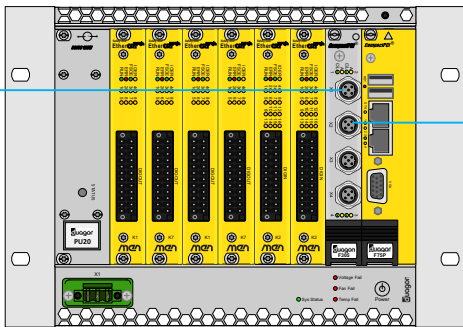


- KT4, Configuration Example**
- 8 digital outputs, SIL 4, through K1/K7 combination: high-side and low-side switching
  - 16 digital inputs, SIL 4, through 2 x K2

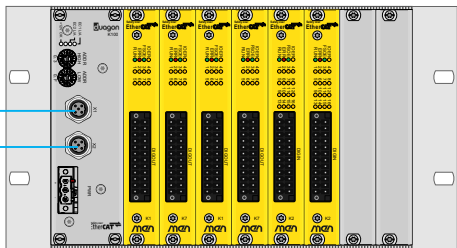
**Note:**  
A KT6 system with six configurable I/O board slots is available on request.

## d-SC System Controller in Combination with Remote I/O Boxes

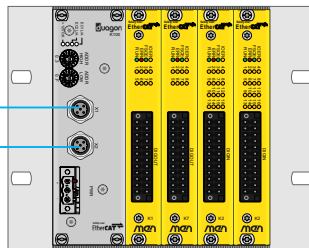
### MH50C d-SC Controller



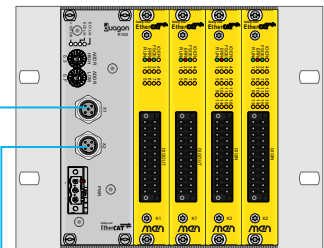
### KT8 d-SC Remote I/O



### KT4 d-SC Remote I/O



### KT4 d-SC Remote I/O





## KT8 | TECHNICAL DATA

### FRONT INTERFACES

- Ethernet
  - Two 4-pin M12 connectors, D-coded, 100BASE-T
  - Four link and activity LEDs (two per channel)
- d-SC system control
  - Two hex switches to configure chassis ID
- Power supply
  - One power inlet connector
  - One voltage status LED
- Safe I/O
  - As configured using plug-in boards

### SAFE I/O

- d-SC I/O Board
- Configurable: yes
- Possible in slots: 1, 2, 3, 4, 5, 6, 7, 8
- Possible Configurations
  - **8 digital outputs, high-side switching, SIL 2 (SIL 4), -40°C to +85°C, conformal coating**
  - **8 digital outputs, low-side switching, SIL 2 (SIL 4), -40°C to +85°C, conformal coating**
  - **16 digital inputs, SIL 2 (SIL 4), -40°C to +85°C, conformal coating**

### SUPERVISION AND CONTROL

- Output voltage supervision and thermal supervision

### ELECTRICAL SPECIFICATIONS

- Supply voltage
  - 24 V, 36 V, 48 V, 72 V, 96 V, 110 V DC nominal; 14.4 to 154 V max. (EN 50155)
  - Power interruption class S2 (10 ms) (EN 50155)
- Power consumption
  - 16 W approx. (with 8x K1)
  - 58 W max.

### MECHANICAL SPECIFICATIONS

- Dimensions
  - (W) 210 mm, (D) 133 mm, (H) 133 mm without brackets and connectors
- Mounting Possibilities
  - Wall/flat surface
  - Rack in 19" cabinet
  - DIN-rail
  - Two systems side-by-side to build a single 19" chassis
- Weight
  - 1450 g (barebone configuration)

### ENVIRONMENTAL SPECIFICATIONS

- Classification for railway applications
  - EN 50155: Rolling stock, vehicle body
  - EN 50125-3: Wayside, at least 3 m off the track inside a switch box, low temp. class T2, high temp. class TX
- Temperature range (operation):
  - -40°C to +70°C with up to +85°C for 10 minutes (EN 50155, class TX; EN 50125-3, low temp. class T2, high temp. class TX)
- Temperature range (storage): -40°C to +85°C
- Cooling concept
  - Air-cooled, airflow 0.5 m/s
- Humidity
  - EN 50155: Rolling stock, vehicle body
  - EN 50125-3: Wayside, at least 3 m off the track inside a switch box
- Vibration/Shock
  - EN 50155: Rolling stock, vehicle body class B
  - EN 50125-3: Wayside, at least 3 m off the track inside a switch box
- Altitude: -300 m to +3000 m
- International Protection Rating (IEC 60529): IP20
- Pollution Degree: PD 2
- Useful life: 20 years (EN 50155:2017, class L4)



## SAFETY

- Functional Safety
  - Certifiable to SIL 1, SIL 2, SIL 3 or SIL 4 according to EN 50129, depending on I/O board configuration
- Electrical Safety
  - EN 60950-1: Class I equipment
- Fire Protection
  - EN 45545-2, hazard level HL3

## EMC

- EN 50155: Rolling stock, vehicle body
- EN 50121-4: Wayside at least 3 m off the track (with external protection elements)

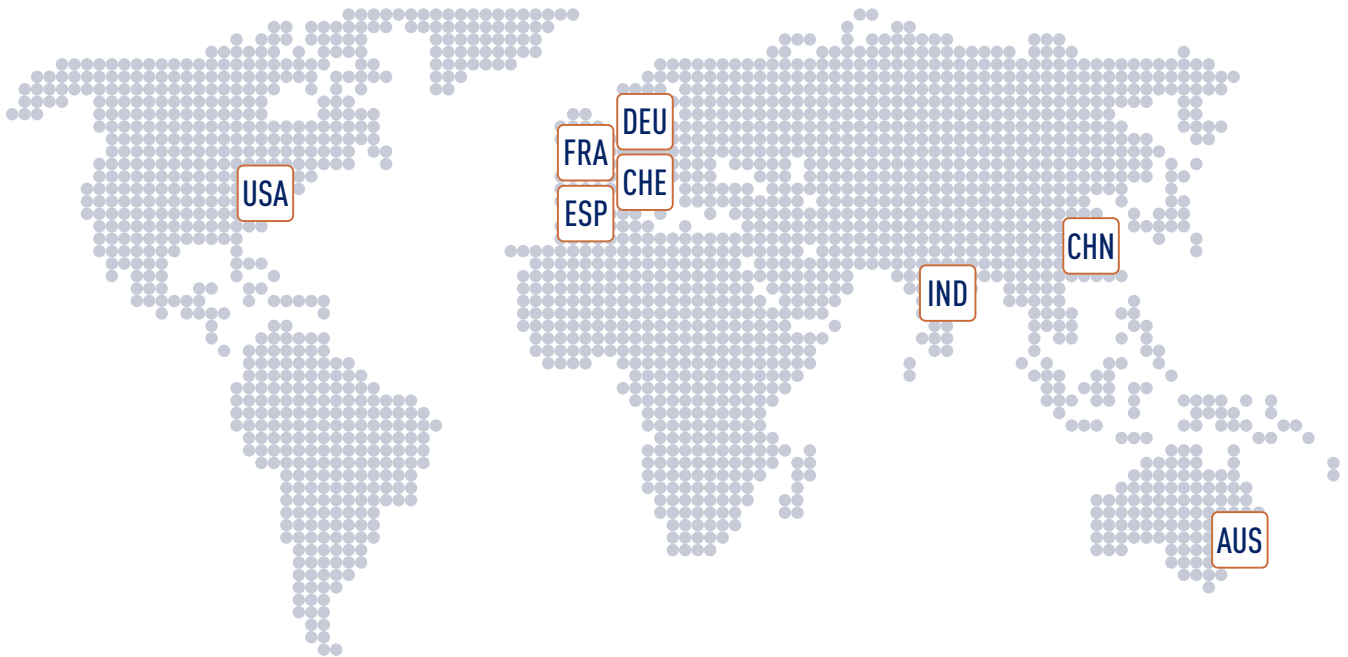
## RELIABILITY

- MTBF: 542 888 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000) (barebone configuration, without I/O boards)

## SOFTWARE SUPPORT

- PACY (Process Data Framework for Cyclic Applications)
- QNX

► See the product User Manual for details on software support: [www.duagon.com/products/kt8/#doc](http://www.duagon.com/products/kt8/#doc)



## duagon | WORLDWIDE

duagon has a global presence with support and sales representatives across 8 countries. With three decentralized engineering and production sites, our customers take advantage of the added competence and flexibility.

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